

SCOPE AND LIMITATIONS OF CAMP APPROACH TO
FEMALE STERILIZATION: OUR EXPERIENCE

by
Rohit V. Bhatt, MD, CCH
Nirmala F. Patel, MD
Saroj Pachauri, MD, DrPH

India Fertility
Research Programme

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By

ROHIT V. BHATT, M.D., C.C.H.
Professor and Head
Department of Obstetrics and Gynecology
Medical College and S.S.G. Hospital
Baroda, India

NIRMALA F. PATEL, M.D.
Department of Obstetrics and Gynecology
Medical College and S.S.G. Hospital
Baroda, India

SAROJ PACHAURI, M.D., Dr.P.H.
Area Coordinator for Asia
International Fertility Research Program
University of North Carolina at Chapel Hill

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the India Fertility Research Programme, Calcutta,
India, and the International Fertility Research
Program, Chapel Hill, North Carolina, U.S.A.

I. INTRODUCTION

In recent years considerable efforts have been made to reduce population growth in India by organizing camps where male and female sterilization services are provided by a visiting team of doctors and nurses to people who ordinarily do not have easy access to such facilities. Such camps have generally been organized either as crash programs to cover large populations in a limited time period or as periodic camps where sterilization services are provided by a team visiting the area at regular time intervals. A woman in the urban area can more easily avail herself of hospital facilities for sterilization than a woman in a rural area (where 80 percent of the population in India live). As a result, many women, who would accept sterilization if facilities were more readily available, are not able to utilize this method of family planning. For this reason, the camp approach to female sterilization was introduced in India.

Large camps provide services to many women in a day. As many as 220,000 sterilization operations have been performed in as short a period as 8 to 12 weeks in India (Gujarat and Kerala State experiments). However, performing so many operations per day has some disadvantages. Although a large contingent of visiting staff is available on the day of the sterilization camp, there is not enough staff to look after the cases during the post-operative phase. One doctor and a nurse cannot adequately care for more than 10 to 15 patients during the post-operative phase. For this reason we have set a fixed limit of 10 to 15 camp sterilizations to be performed per day at each site.

Sterilization camp programs have the obvious advantage of reaching eligible women in areas with inadequate or no sterilization services. It is important to evaluate the services provided through organized camps by adequately documenting data on subjects sterilized. In the present study, sterilizations performed in camps organized in the district of Baroda, India, between November, 1972, and April, 1974, are reported.

The objectives of this study were to:

1. evaluate clinical problems and complications of female sterilization in the camp setting,
2. study the patient characteristics and fertility profile of women undergoing sterilizations in camps, and
3. document the feasibility of providing female sterilization services through organized camps.

II. MATERIALS AND METHODS

The data for this study were recorded on standard, one page forms designed to document pertinent data on patient characteristics, pregnancy and menses, complications (immediate and delayed), difficulties at surgery and surgical time. Data collection was done in collaboration with the India Fertility Research Programme; analysis was done in cooperation with the International Fertility Research Program.

Sterilizations performed on 749 women between November, 1972, and April, 1974, are reported. These women attended camps at six Primary Health Centres within a 20-mile radius of the Medical College and Shree Sayaji General Hospital, Baroda. The patients were scheduled for surgery by the regular staff of each Primary Health Centre. About 10 to 12 patients were scheduled for each camp and were examined and admitted on the day prior to surgery.

A Primary Health Centre or a school building is selected for the camp. The health centres usually had about five maternity beds, a labor room and facilities for conducting clinics. There is no regular operation

theater; therefore one of the rooms is temporarily converted into an operation theater. Spot lights are not available. Natural lighting is usually relied upon. When necessary, a torch is utilized. The instruments are sterilized in boiling water on a kerosene stove. (See photo A below)

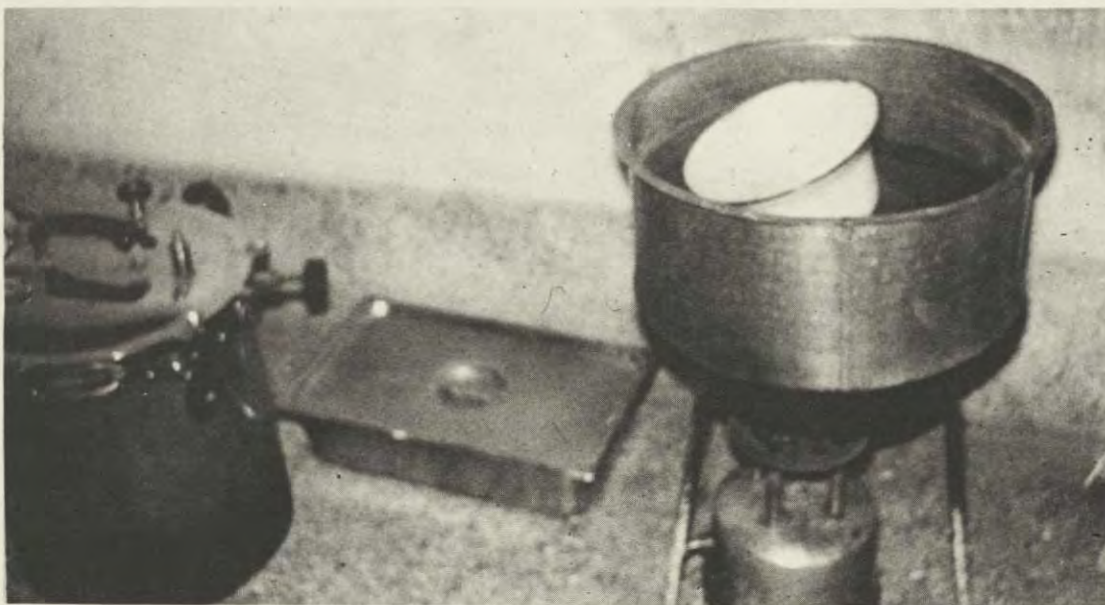


Photo A. Instrument sterilization.

A gynecologist (usually a senior resident) visits the centre in the transport provided by the government. A brass tank is filled to provide running water for washing hands (See photo B, page 4). The surgeon himself gives spinal anesthesia and then performs the operation (See photo C, page 4). Sterilizations were performed by the vaginal or abdominal Pomeroy technique. The motivator who brought the patient for the operation usually stands near the head of the patient to give moral support. Between operations, the surgeon puts on fresh gloves, but does not re-scrub or change gowns. All patients are given an injection of long-acting penicillin. The sutures are removed on the sixth day and the patient is discharged on the seventh day. The field worker is scheduled to make a visit to the patient's home after a fortnight.



Photo B. Copper Tank Used as Source of Running Water.



Photo C. Surgeon Administering the Spinal Anesthesia.

III. RESULTS

The results are presented in 2 sections: (1) socio-demographic characteristics and fertility profile of women undergoing camp sterilization, and (2) clinical outcome of the sterilization procedures.

A. Socio-demographic Characteristics and Fertility Profile of Women Undergoing Camp Sterilization

Age and Parity

The vast majority of the patients in this study (80.5%) were 25-34 years of age; their median age was 29.5 years and their median parity was 4.3 (Table I-A). No patient had parity less than 2; 27.1 percent were of parity 3 or less; and 73.2 percent were of parity 3 to 5.

Table I-A

AGE AND PARITY OF CAMP STERILIZATION CASES
BARODA, INDIA, NOVEMBER, 1972 TO APRIL, 1974

| Patient Characteristics | Number | Percent |
|-------------------------|--------|---------|
| <u>Age</u> | | |
| < 20 | 0 | 0 |
| 20-24 | 63 | 8.4 |
| 25-29 | 307 | 41.0 |
| 30-34 | 296 | 39.5 |
| 35-39 | 65 | 8.7 |
| 40+ | 18 | 2.4 |
| Median | 29.52 | |
| <u>Parity</u> | | |
| 0 | 0 | 0.0 |
| 1 | 0 | 0.0 |
| 2 | 35 | 4.7 |
| 3 | 168 | 22.4 |
| 4 | 214 | 28.6 |
| 5 | 166 | 22.2 |
| 6 | 87 | 11.6 |
| 7 | 50 | 6.7 |
| 8 | 20 | 2.7 |
| 9 | 5 | 0.7 |
| 10 | 4 | 0.5 |
| Median | 4.30 | |

Figure 1 shows the steep increase in median parity with increasing age. At 20-24 years the median parity was 3.0; at 40-44 years it increased to 7.6. Most of the patients who accepted tubal ligation belong to the high parity group. However, it is likely that in the near future, women of low parity will also begin to accept sterilization in the rural areas. Rural women are generally slow to accept innovations such as sterilization and the very fact that these rural women now accept sterilization is promising. It is significant that 340 women (45.4%) had interval sterilizations. Until recently, only post-partum sterilization was acceptable to most patients. An increasing number of interval sterilizations suggests that the motivation to accept family planning is well sustained even after the puerperium.

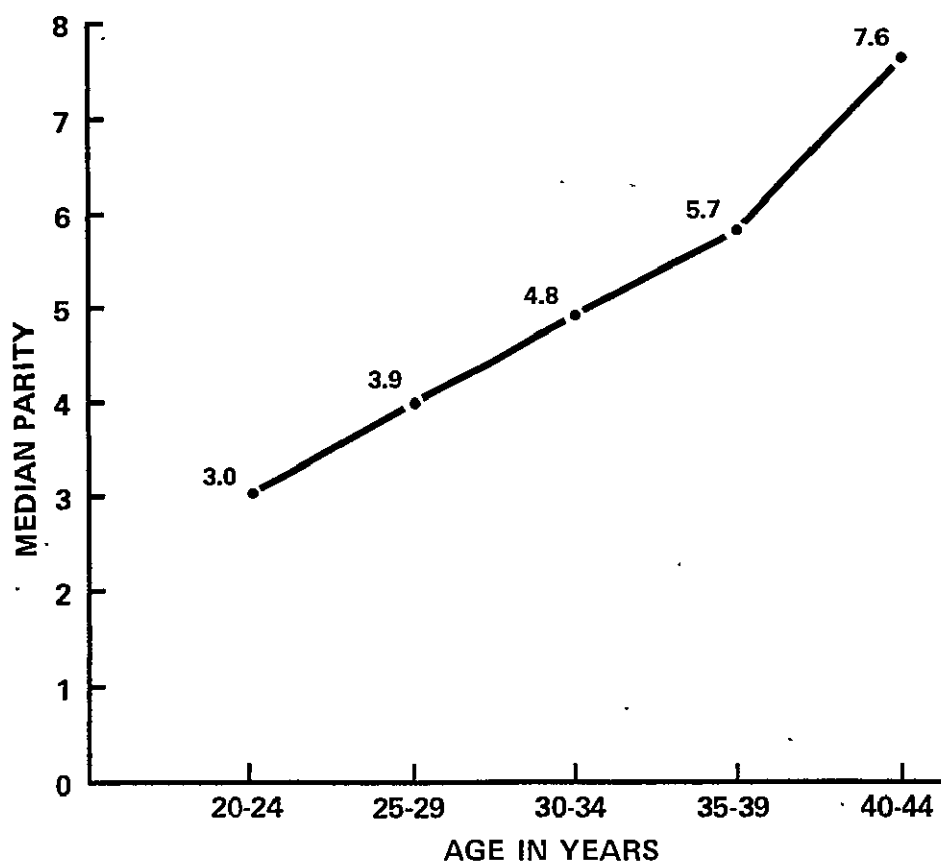


Figure 1. Median Parity by Age of Camp Sterilization Patients in Baroda, India, November, 1972 to April, 1974.

Number of Living Children, Age of Youngest Child and Child Loss

While only 6.1 percent of the subjects had less than 3 living children, 62.2 percent had 3 or 4 living children and 31.7 percent had five or more living children (Table I-B). These rural women generally accepted tubal ligation only after they had two living male children.

Figure 2 shows that 45 percent of the subjects had a child less than one year of age at the time they were sterilized; this high figure is not surprising since 48.5 percent of the women had post-partum sterilizations. For 14.2 percent of the women, the youngest child was one to two years of age, and in 41 percent the youngest child was two or more years of age.

Over 70 percent of the women reported no child loss, 15.5 percent had lost one child, and 12.5 percent reported that they had lost two or more children. The median child loss for the study group was 0.2 in the series (Table I-B).

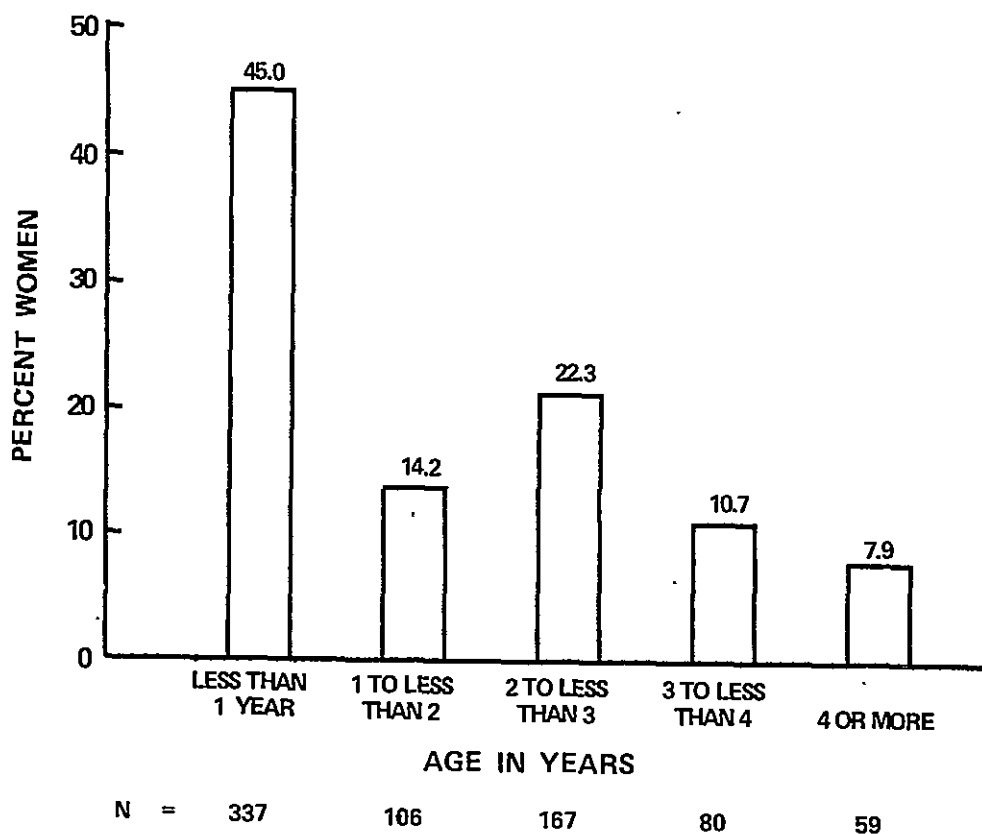


Figure 2. Age of Youngest Living Child of Camp Sterilization Patients in Baroda, India, November, 1972 to April, 1974.

Table I-B

SELECTED PATIENT CHARACTERISTICS OF
CAMP STERILIZATION CASES IN BARODA, INDIA
NOVEMBER, 1972 TO APRIL, 1974

| Patient Characteristics | Number | Percent |
|-----------------------------|--------|---------|
| <u>Living Children</u> | | |
| 0 | 0 | 0.0 |
| 1-2 | 46 | 6.1 |
| 3-4 | 466 | 62.2 |
| 5-6 | 208 | 27.8 |
| 7-8 | 29 | 3.9 |
| Median | | 3.92 |
| <u>Child Loss</u> | | |
| 0 | 538 | 71.8 |
| 1 | 116 | 15.5 |
| 2 | 61 | 8.1 |
| 3 | 19 | 2.5 |
| 4 | 9 | 1.2 |
| 5+ | 5 | 0.7 |
| Median | | 0.20 |
| <u>Education of Subject</u> | | |
| 0 | 443 | 59.1 |
| 1-3 | 75 | 10.0 |
| 4-6 | 122 | 16.3 |
| 7-9 | 78 | 10.4 |
| 10-12 | 30 | 4.0 |
| 13+ | 1 | 0.1 |
| Median | | 0.35 |
| <u>Education of Husband</u> | | |
| 0 | 214 | 28.6 |
| 1-3 | 89 | 11.9 |
| 4-6 | 203 | 27.1 |
| 7-9 | 131 | 17.5 |
| 10-12 | 98 | 13.1 |
| 13+ | 14 | 1.9 |
| Median | | 4.25 |
| <u>Religion</u> | | |
| Hindu | 674 | 90.0 |
| Muslim | 74 | 9.9 |
| <u>Employment</u> | | |
| Employed | 14 | 1.9 |
| Not Employed | 735 | 98.1 |

Education, Employment, Religion and Residence

Only 4.0 percent of the women had received a high school education, 40.9 percent had had some formal education while 59.1 percent had had no education. Educational achievement of the husbands was higher, as expected; only 28.6 percent had received no formal education. The median educational achievement of the women undergoing sterilization and that of their husbands was 0.35 and 4.25 school years, respectively (Table I-B). Slightly more than half of the women came from rural areas (59.5%). The majority (90.0%) were Hindus; 9.9 percent were Muslims and there was one Catholic. The vast majority (98.1%) were not gainfully employed (Table I-B) and all of the women undergoing sterilization were married.

Previous Pregnancy Outcome Events

Rates for reported previous pregnancy outcome were calculated for the women in the study (Table II). The rates for induced and spontaneous

Table II

PREGNANCY OUTCOME EVENTS OF CAMP STERILIZATION CASES IN BARODA, INDIA, NOVEMBER, 1972 TO APRIL, 1974

| Pregnancy Outcome Event | Number | Rate per 1000* |
|-------------------------|--------|----------------|
| Induced Abortions | 44 | 12.3 |
| Spontaneous Abortions | 112 | 31.3 |
| Stillbirths | 42 | 11.7 |
| Live births | 3378 | 944.6 |
| Living Children | 2733 | 885.0 |
| Male | 1595 | 516.5 |
| Female | 1138 | 368.5 |
| Child Loss | 355 | 115.0 |
| Total Pregnancies | 3576 | 4774.4 |
| Pregnancy Wastage | 198 | 55.4 |

*Induced and spontaneous abortion, stillbirth and live birth birth rates and pregnancy wastage are expressed per 1000 pregnancies. Rates for male and female living children and child loss rates are expressed per 1000 live births excluding present births in post-partum sterilization cases. Total pregnancies are expressed per 1000 women.

abortions in the series were 12.3 and 31.3 per 1000 pregnancies, respectively. The stillbirth rate was 11.7 per 1000 pregnancies and the child loss rate was 115.0 per 1000 live births. The sex ratio of living children was in favor of males.

Prior Contraceptive Practice

The great majority (97.7%) of the women had used no contraceptive method; only 9 (1.2%) used an IUD; 2 (0.3%) were taking oral pills; and in 5 cases (0.7%) the husbands used condoms. It was interesting to note that one woman reported a previous sterilization.

B. Clinical Outcome of the Sterilization Procedures

Pre-existing Conditions and Prior Surgery

There were no pre-existing medical conditions for 62.2 percent of the subjects; 259 (34.6%) had hemoglobin less than 10 gms percent; 13 (1.7%) had abnormal pelvic findings which were not serious in nature; 7 (0.9%) had some systemic disease and 12 (1.6%) had had previous pelvic or abdominal surgery.

Sterilization and Concurrent Surgery

Of the total procedures reported, 340 were interval sterilizations; other concurrent surgery was performed in 5 (1.5%) of these cases. An almost equal number of the procedures were post-partum sterilizations (363); 7 (1.9%) of these cases had cesarian section deliveries and the rest had vaginal deliveries. Sterilizations following abortion were performed in 44 women; of these 27.3 percent were second trimester terminations. Two cases are not listed here since the outcome of the last pregnancy is unknown. Half of all terminations were done by D & C, 19 (45.2%) by hysterotomy and 2 (4.8%) by other methods.

Sterilizations were performed in all cases by the Pomeroy technique. In the great majority (92.1%) of the subjects, the procedure was performed via the abdominal route.

Anesthesia

The majority (97.7%) of the sterilizations were performed using regional anesthesia; 14 abdominal Pomeroy procedures were performed using local anesthesia and analgesia; and 3 were performed under general anesthesia.

Difficulties at Surgery

Difficulties at surgery were reported in 6 cases; in 3 cases adhesions presented some difficulty, and in 3 others the surgeon had difficulty visualizing the tubes. In four of these cases the vaginal route was used and in two the abdominal route was used. In one vaginal Pomeroy case, the right tube could not be reached due to adhesions and laparotomy was necessary. In another case, an unusually short tube made it necessary to perform a fimbriectomy.

Complications

Immediate post-operative complications and complications occurring during the period of hospitalization were recorded for all cases. Since only 13.2 percent of the subjects were followed after discharge, data on follow-up complications is incomplete and may not reflect the true rates.

Information on complications was available for 742 patients. Table III shows the complications reported for 324 cases of interval sterilization by the abdominal Pomeroy technique and in whom no associated concurrent surgery was performed. There were 7 (2.2%) anesthesia complications, 1 (0.3%) wound complication and 1 (0.3%) bowel/bladder injury among these interval sterilization cases. There were 9 (2.8%) subjects who had one or more complications in this category. Five patients undergoing interval sterilization reported later with wound complications.

Among the 396 abdominal Pomeroy sterilizations performed within 10 days after abortion or delivery, there were 12 (3.0%) anesthesia complications, 2 (0.5%) cases of fever greater than 38°, 2 (0.5%) cases of bowel injury and 8 cases (2.0%) of wound infection. Twenty-one women (5.3%) in this group of subjects had one or more complications. Five

Table III

COMPLICATIONS REPORTED FOR ABDOMINAL POMEROY
CAMP STERILIZATION CASES IN BARODA, INDIA,
NOVEMBER, 1972 TO APRIL, 1974

| Reported Complications | Interval Sterilizations N=324 | | Sterilization Within 10 days of Abortion or Delivery N=386 | |
|--------------------------------------|----------------------------------|-----|---|-----|
| | No. | % | No. | % |
| Anesthesia Complications | 7 | 2.2 | 11 | 2.8 |
| Wound Complications | 1 | 0.3 | 7 | 1.8 |
| Bowel/Bladder Injury | 1 | 0.3 | 1 | 0.2 |
| Fever | 0 | 0.0 | 2 | 0.5 |
| Women with One or More Complications | 9 | 2.8 | 18 | 4.7 |

- 1) Complications occurring during the hospitalization period only are reported in this table.
- 2) None of the subjects included in this analysis had any concurrent surgery.

patients reported later with wound complications, two reported a follow-up fever of 38° C or above, and one patient complained of pain at the site of the abdominal incision.

For 22 patients, sterilization was performed using the vaginal Pomeroy technique. Among these patients one case of fever, one wound complication, one bowel/bladder injury, and one anesthesia complication were reported. Two patients reported follow-up complications; one, fever greater than 38° C; and one, pain in the region of the vaginal incision.

Additional Surgery

In six cases (0.8%) surgery in addition to sterilization and pregnancy termination was performed. Ovarian cysts were removed in 2 cases, D & E was performed for diagnostic reasons in 2 cases, a polyp was removed in one case and in one patient both a diagnostic D & E and removal of a dermoid cyst were performed.

Surgical Time and Hospitalization

Surgical time was assessed from the initial incision to the final closure. The mean time required to perform the abdominal Pomeroy procedure in patients who had no immediate complications was 15.0 minutes; in 85.4 percent of the cases the procedure was completed within 20 minutes. The mean time for completing the procedure was not significantly higher (17.5 minutes) in subjects with immediate complications. The mean time for completing the vaginal Pomeroy procedures was 21.2 minutes in subjects not having immediate complications (Figure 3).

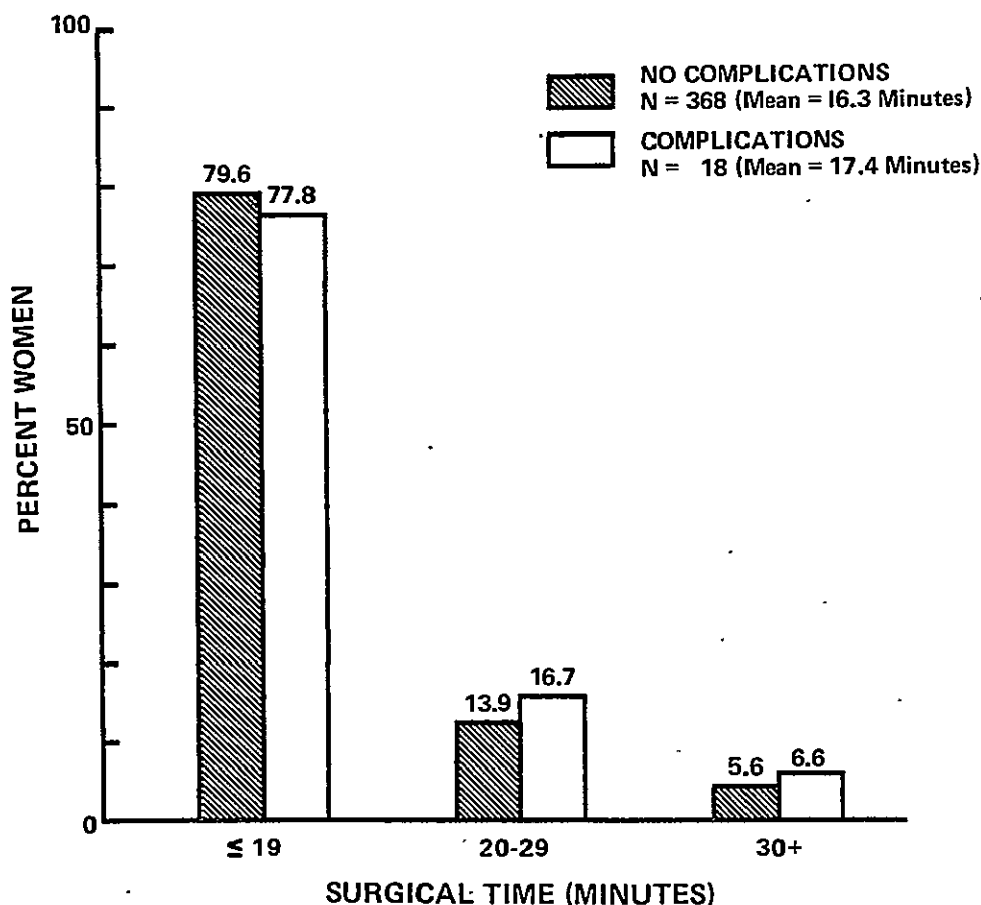


Figure 3. Surgical Time for Abdominal Pomeroy Sterilization Cases in Baroda, India, November, 1972 to April, 1974.

The mean duration of post-sterilization hospital stay for patients not having immediate complications was 7.2 days for subjects undergoing abdominal Pomeroy procedures; 34.1 percent were hospitalized for 5-6 days and 65.9 percent for a longer duration. For patients with complications, the average hospital stay was not significantly longer.

IV. DISCUSSION

Sterilization camps offer a promising approach for providing sterilization services to eligible women in areas where such facilities do not exist and where the need for such services is great. However, in order to recommend such services, it is essential that they be evaluated by documenting the safety and effectiveness of the procedures, the cost of hospitalization, medical and paramedical personnel required and the acceptability of such services.

The results of the present evaluation indicate that the women undergoing sterilization in Baroda district were generally young. Their mean number of living children was 4; this figure is comparable to those reported from other Indian camp series. The mean number of living children reported from vasectomy camps in India ranged from 3.1 to 5.3.¹

Using formal education as a rough estimate of literacy, in the present series, the literacy rate* of women undergoing sterilization was 40.9 percent. The rate was 47 percent in women undergoing sterilization at the Shree Sayaji Hospital.² In other series of Indian women undergoing sterilization, the rates vary from 60-95 percent.¹ It appears that lack of education was not a major determinant of the acceptance of sterilization by this group of women. Women from both rural and urban areas utilized the services in the Baroda district camps. High fertility with concomitant high child loss rates were prevalent in this group.

The percentage of women reporting previous contraceptive practice was very low (2.3%) in the present series. Variable rates are reported (1.2 to 20.3) in other studies.^{3,4,5} The rates of contraceptive practice and type of contraceptives used depend on several factors among which the availability of fertility control services is an important one.

*Literacy rate included the subjects who had any level of school education.

It is important to evaluate the safety of female sterilization procedures in a camp situation where facilities are minimal and adherence to normal aseptic procedures cannot be assured. Complication rates following Pomeroy sterilizations in various Indian reports range between 10.5 and 50.4 per 100 cases.⁶ The complication rates reported in this study were considerably lower. Among subjects undergoing sterilization with no concurrent surgery, the percentage of cases with one or more immediate complications was 4.0 in this series, while the corresponding figure for a similar series at the Shree Sayaji Hospital at Baroda was 10.1². Lower morbidity in the camp series could be attributed to two factors: there is generally a more careful pre-selection of patients for sterilization in camps due to the limited facilities available for coping with serious complications, and patients in camps may show a better response to prophylactic antibiotics than those in hospitals as hospitals might harbor resistant strains of staphylococci and other pathogens. Complication rates in USA studies range between 7.6 to 24.0 for series in which sterilization was performed using the Pomeroy technique.⁶ However, there are several fallacies in making such comparisons between studies. For these comparisons to be valid, it is essential not only to define the specific nature of complications which should be reported but also the duration of follow-up should be specified. Such cross-center studies are planned by the India Fertility Research Programme to document the safety and effectiveness of different sterilization procedures. No deaths were reported in the present study. Death rates reported in Indian studies range from 0.0 to 0.21 percent with an overall rate of 0.07 percent in 5 different series reporting 8,753 sterilizations performed between 1961 and 1970.⁶

The effectiveness of the procedures should be evaluated by following the sterilized women for at least one year. No pregnancies have so far been reported in the case of any of the women sterilized in the present series. However, long-term follow-up would be required to report on the effectiveness of the procedures used. Reported failure rates in Indian

studies range from 0.0 to 0.4 percent for Pomeroy sterilizations.. The rates reported for the U.S.A. series range from 0.0 to 2.0 percent when the same procedure was evaluated.¹

Duration of hospital stay contributes considerably to the overall cost of the service. In the present series, the overall duration of hospital stay was 7.6 days. Outpatient procedures, such as laparoscopy, could minimize this cost for large camps.

The study suggests that rural women prefer an operation in their own setting. They are probably reluctant to go to the hospital for an operation unless absolutely necessary. Emotionally, they appear secure in their own setting as compared to an impersonal hospital atmosphere. They appreciate the continuous presence of their relatives. Fortunately, rural people have enough time to devote to their sick people. It is not unusual to find the whole family travelling in bullock-cart and staying outside the health center under a tree. They cook food and live there in apparent comfort and security.

V. SUMMARY AND CONCLUSIONS

An evaluation of 749 sterilizations performed in camps organized in Baroda district is reported. The findings of this study indicate that camp sterilization services can be offered to women in areas where such facilities do not exist and where the need for providing fertility control services is great. The present evaluation documents the feasibility and safety of providing such a service. The camp approach appears to be culturally and emotionally acceptable to rural women. Outpatient sterilization could contribute considerably to lowering the cost of such a service. To further evaluate the safety and effectiveness of the sterilization procedures, studies with long-term follow-up are needed.

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Carolina Population Center

**University of North Carolina at Chapel Hill, NCNB Plaza,
Chapel Hill, North Carolina 27514, U.S.A.**

The International Fertility Research Program was established in 1971 to accelerate the development of improved means of fertility control. The Program sponsors field studies of newer means of fertility control, including pregnancy termination, menstrual regulation, intra-uterine contraceptive devices, sterilization, and systemic contraceptives. Affiliated with the Program is an extensive international network of study Contributors and research and development centers.